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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/629,785	07/30/2003	Yuji Harada	0171-0996P	9402
2292	7590	07/28/2004	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			HU, HENRY S	
			ART UNIT	PAPER NUMBER
			1713	

DATE MAILED: 07/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AS

**Office Action Summary**

Application No.

10/629,785

Applicant(s)

HARADA ET AL.

Examiner

Henry S. Hu

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on Oath & IDS of 7-30-03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 2 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 7-30-2003.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. It is noted that USPTO has received an **oath/declaration** as well as an **IDS**, both filed on July 30, 2003. **Claims 1 and 2 are pending now.** An action follows.

### *Specification*

2. The disclosure is objected to because of the following informalities:

(a) On page 18 at line 6, recitation of "1-1.20" may be improper and better to change to "**1 to 1.20**" to be consistent with the same wording used throughout the specification, for instance please see Claim 1 or page 9 at line 31.

(b) On page 15 at line 34, recitation of "a ratio" may be improper and better to change to "**a molar ratio**" or "**a ratio by mole**" to be clear. Otherwise, it may mean a ratio by weight.

Appropriate corrections (a) and (b) are required.

### *Double Patenting*

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van*

Art Unit: 1713

*Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1 and 2 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 9-18 of copending Application No. **10/316183**, now **USPG-PUB 2003/0232940 A1 to Komoriya et al.** (with priority date 12-31-2001).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented. Although the conflicting claims are not identical, they are not patentably distinct from each other because the subject matter claimed in the instant application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter, as follows:

4. **Parent Claim 1 and dependent Claim 2** of present invention relate to a fluorinated polymer obtained by living anion polymerization of a monomer having a styrene-based structure of the general formula (1), wherein **R<sup>1</sup> and R<sup>2</sup> each are an acid labile group and R<sup>3</sup> is hydrogen** or methyl, and having a polydispersity index of 1 to 1.20.

Art Unit: 1713

5. In a close examination, **Claims 9-18** in copending Application No. 10/316183, now USPG-PUB 2003/0232940 A1 to Komoriya et al., relate to the preparation of various **fluorine-containing** copolymers containing the repeating units of the claimed polymerizable monomers having a **styrene-based** structure of the general formula (1), wherein R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> are as specified. **Its R<sub>3</sub> and R<sub>4</sub> attached to alcoholic oxygen can be** independently a hydrogen atom, an alkyl group, a fluorinated alkyl group, a ring structure having an aromatic ring, or **an acid-labile protecting group**.

In a close comparison on both cases, they are **genus-species relationship**, e.g. R<sub>3</sub>/R<sub>4</sub> of “183” contains a small genus and one ordinary skill in the art **would pick up an acid-labile group as R<sub>3</sub>/R<sub>4</sub> group**. Although various intermediates may be derived from Komoriya’s alcoholic starting material, the compounds with labile acid-protected groups are the most useful due to the fact that such a modification will make polymers becoming very **useful in lithographic photoresist compositions especially when it is combined with photoacid generator**, which is known in the art. Therefore, one having ordinary skill in the art would have found it obvious to modify hydroxyfluoroalkyl-substituted styrene by **attaching acid labile groups on the alcoholic oxygen** and then run for polymerization, such obtained polymers become very useful in lithographic photoresist compositions especially when they are combined with photoacid generator.

As to R<sub>1</sub>/R<sub>2</sub>, it contains an even smaller genus (methyl and trifluoromethyl), one ordinary skill in the art would **pick up trifluoromethyl as R<sub>3</sub>/R<sub>4</sub> group**. By doing so, some unique

Art Unit: 1713

physical properties such as chemical resistance and lower dielectric constant would be thereby enhanced due to an increase on the content of fluorine.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. *Parent Claim 1 of present invention relates to a fluorinated polymer obtained by living anion polymerization of a monomer having a styrene-based structure of the general formula (1), wherein  $R^1$  and  $R^2$  each are an acid labile group and  $R^3$  is hydrogen or methyl, and having a polydispersity index of 1 to 1.20. See other limitations of dependent Claim 2.*

Art Unit: 1713

8. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allen et al. (USPG-Pub 2002/0164538 A1) or Hashimoto et al. (USPG-Pub 2002/0155376 A1), each individually in view of Sprague et al. (Journal of Fluorine Chemistry, Vol. 52, pp. 301-306, (1991)).

Regarding the limitation of parent **Claim 1 and dependent Claim 2**, Allen et al. (USPG-Pub 2002/0164538 A1) or **Hashimoto et al.** (USPG-Pub 2002/0155376 A1) et al. each individually disclose the preparation of monomeric compound of **mono-hydroxyfluoroalkyl-substituted styrene, its acid-protected compound as well as the homo- and co-polymers, thereof**. Specifically, see Allen at page 2 on paragraph 0015 – 0027 and 0084-0091, and Hashimoto at page 1 on paragraphs 0004 and 0010. With respect to using the acid labile groups, **both Allen and Hashimoto have disclosed the modification on monomer by attaching protective acid-labile groups** on the alcoholic oxygen (see page 4 at paragraph 68 in Allen). More specifically, see abstract and page 6 at paragraphs 84-86 in Hashimoto as well as page 6, paragraph 0081-0086 in Allen for **acrylic monomers**, see page 2 and 4-6 in Hashimoto for **alicyclic acrylate monomer**, and see page 4 at paragraph 54 the polymer #1 for **vinyl acetate with R<sub>9</sub> having a carbonyl group**. Regarding the preparation of polymers by **living anion polymerization to obtain a polydispersity of 1 to 1.20**, both Allen and Hashimoto have disclosed that all types of polymerization process can be used (see Allen on paragraphs 0004-0006; see Hashimoto on paragraphs 0004-0006).

Art Unit: 1713

9. However, each of Allen and Hashimoto is **silent about adding an additional substituent of hydroxyfluoroalkyl group on styrene and forming a structure of meta-symmetry**. Sprague et al. teach the preparation of a fundamentally the same claimed compound but with  $\alpha,\beta,\beta$ -trifluorostyrene structure (page 301-302). Additionally, Sprague has implicitly pointed out the advantage of using non-fluorinated analogue (the styrene analogue), since the trifluoro-substituted compound is found to be ordinarily resistant to the usual free radical polymerization and is proceeded with low poplymerization yield in comparison the regular non-trifluoro-substituted styrene derivatives (page 302 at bottom paragraph). The advantage is that more functional groups will allow further modification use or increase crosslinking for improved property performance, which is known in the art.
10. In light of the fact that all styrene compounds, prepared by Sparague, Allen and Hashimoto, are containing fundamentally the same substituents and are useful as monomeric compound for polymerization. Therefore, one having ordinary skill in the art would have found it obvious to modify Allen or Hashimoto's acid-labile protected mono-hydroxyfluoro-alkyl-substituted styrene by **adding an additional the same substituent on styrene and thereby forming a structure of meta-symmetry** as taught by Sparague with two advantages. One advantage is the addition of such an additional group on styrene will allow additional property enhancement due to fluorine content; the other advantage is that it will allow an additional functional group for modification use and increase crosslinking for improved property performance. Thereby a better polymeric product can be obtained.



Art Unit: 1713

11. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Middleton (US 3,179,640) in view of Sprague et al. (Journal of Fluorine Chemistry, Vol. 52, pp. 301-306, (1991) and either Allen et al. (USPG-Pub 2002/0164538 A1) or Hashimoto et al. (USPG-Pub 2002/0155376 A1).

Regarding the limitation of parent **Claim 1 and dependent Claim 2**, the reference **Middleton** discloses the preparation of a monomeric compound of **mono-hydroxyfluoroalkyl-substituted styrene as well as its homo- and co-polymers** (column 1, line 3 – column 2, line 31). Regarding the preparation of polymers by **living anion polymerization to obtain a polydispersity of 1 to 1.20**, Middleton has disclosed that various types of polymerization process can be used (column 5, line 67 – column 7, line 64).

12. The Middleton reference is **silent about adding an additional substituent of hydroxyfluoroalkyl group on styrene and forming a structure of meta-symmetry**, the Middleton reference is also **silent about adding acid labile protecting groups on alcoholic oxygen**. With respect to additional hydroxyfluoroalkyl group on styrene, **Sprague et al.** teach the preparation of a fundamentally the same claimed compound but with  $\alpha,\beta,\beta$ -trifluorostyrene structure (page 301-302). Additionally, **Sprague has implicitly pointed out the advantage of using non-fluorinated analogue**, since the trifluoro-substituted compound is found to be ordinarily resistant to the usual free radical polymerization and is with low polymerization yield in comparison the regular non-trifluoro-substituted styrene derivatives (page 302 at bottom

Art Unit: 1713

paragraph). The advantage is that an additional functional group will allow further modification use or increase crosslinking for improved property performance, which is known in the art.

13. With respect to using the acid labile groups, **each of Allen and Hashimoto has disclosed the modification on monomer by using protective acid-labile groups** (see page 4 at paragraph 68 in Allen). Specifically, see abstract and page 6 at paragraphs 84-86 in Hashimoto as well as page 6, paragraph 0081-0086 in Allen for **acrylic monomers**, see page 2 and 4-6 in Hashimoto for **alicyclic acrylate monomer**, see page 4 at paragraph 54 the polymer #1 for **vinyl acetate with R<sub>9</sub> having a carbonyl group**. The advantage of is that such polymers having acid labile groups are useful in lithographic photoresist compositions especially when it is combined with photoacid generator (see abstract, line 3-5; paragraph 0093-0096 for Allen); (see abstract, line 5-6; paragraph 0020 for Hashimoto).

14. In light of the fact that all styrene compounds, prepared by Middleton, Sparague, Allen and Hashimoto, are containing fundamentally the same substituents and are useful as monomeric compound for use in polymerization. Therefore, one having ordinary skill in the art would have found it obvious to modify Middleton's mono-hydroxyfluoroalkyl-substituted styrene by **adding an additional substituent of hydroxyfluoroalkyl group on styrene and forming a structure of meta-symmetry** as taught by Sparague **as well as further attaching acid labile groups on the alcoholic oxygen** as taught by Allen or Hashimoto with a total of three advantages. The first advantage is the addition of such an additional hydroxyfluoroalkyl group on styrene will allow additional property enhancement due to an increase on fluorine content; the second

advantage is that it will allow an additional functional group for modification use and increase crosslinking for improved property performance. The third advantage is such obtained polymers having acid-protected groups are useful in lithographic photoresist compositions especially when it is combined with photoacid generator. Thereby a better polymeric product can be obtained.

15. Claim 1 and 2 are provisionally rejected under 35 U.S.C. 103(a) as being obvious over copending Application No. **10/316183**, now **USPG-PUB 2003/0232940 A1 to Komoriya et al.** (with priority date 12-31-2001), which has a common assignee or at least one common inventor with the instant application. Based upon the earlier effective U.S. filing date of the copending application, it would constitute prior art under 35 U.S.C. 102(e) if published or patented. This provisional rejection under 35 U.S.C. 103(a) is based upon a presumption of future publication or patenting of the conflicting application.

This provisional rejection might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the copending application was derived from the inventor of this application and is thus not the invention "by another," or by a showing of a date of invention for the instant application prior to the effective U.S. filing date of the copending application under 37 CFR 1.131. For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Art Unit: 1713

16. The discussion of the provisional obviousness-type double patenting rejection of copending Application No. **10/316183**, now **USPG-PUB 2003/0232940 A1 to Komoriya et al.** (with priority date 12-31-2001), for Claims 1 and 2 of this office action is incorporated here by reference. One ordinary skill in the art would pick up an acid-labile group as  $R_3/R_4$  group as well as pick up trifluoromethyl as  $R_3/R_4$  group.

### ***Conclusion***

17. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. The following references relate to a fluorinated polymer obtained by living anion polymerization of a monomer having a styrene-based structure with acid labile groups:

**US Patent No. 5,310,619 to Crivello et al.** only disclose a process to prepare a resist composition comprising phenolic resin, an acid forming onium salt and a tert-butyl ester or tert-butyl carbonate which is acid-cleavable (title; abstract, line 1-6). No claimed styrene derivative or its copolymers are disclosed (column 4-7). Therefore, Crivello fails to teach or fairly suggest limitation of present application.

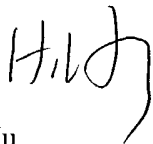
18. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Henry S. Hu whose telephone number is **(571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

Application/Control Number: 10/629,785  
Art Unit: 1713

Page 12

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306 for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Henry S. Hu

July 22, 2004



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